

## SELF REFERENCING MARK INDEPENDENT ALIGNMENT SENSOR

### ABSTRACT OF THE DISCLOSURE

Coherent illumination is used to illuminate a symmetrical alignment mark with an image rotation interferometer producing two images of the alignment mark, rotating the images 180° with respect to each other, and recombining the images interferometrically. The recombined images interfere constructively or destructively, in an amplitude and or polarization sense depending upon the method of recombination, when the alignment sensor is located at the center of the alignment mark. The rotation interferometer is preferably a solid glass assembly made of a plurality of prisms. A detector extracts the alignment information from the image rotation interferometer. The resulting center of the alignment mark is accurately determined. A relatively large number of different alignment mark patterns may be utilized, as long as the alignment mark patterns exhibit one hundred and eighty degree symmetry. Parallel lines, a grid pattern, or a checkerboard grating may be used. The alignment sensor may be applied to a scanning photolithographic system providing sinusoidal alignment signals. The alignment system is particularly applicable to photolithography as used in semiconductor manufacturing.

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